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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/883,981	06/20/2001	John W. Andrews	BU9-98-225 DIV	3116

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EXAMINER

BLUM, DAVID S

ART UNIT	PAPER NUMBER
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2813

DATE MAILED: 01/17/2002

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/883,981

Applicant(s)

ANDREWS ET AL.

Examiner

David S Blum

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 30 November 2001.
- 2a) ☒ This action is FINAL. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 8, 15 and 23-30 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 8, 15 and 23-30 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Specification

1. Claim 15 is objected to because of the following informalities: The use of "predetermined" in claim 15 reads on a nebulous mental step conducted prior to the manipulative steps of the claimed process, hence rendering the present process claim unclear in meaning in scope. If applicant wishes to patent detail controls over the recited process, then the process steps must be positively recited. See *Seagram & Sons Inc. vs. Marshall*, 84 USPQ 180.

Appropriate correction is required.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in-

(1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effect under this subsection of a national application published under section 122(b) only if the international application designating the United States was published under Article 21(2)(a) of such treaty in the English language; or

(2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that a patent shall not be deemed filed in the United States for the purposes of this subsection based on the filing of an international application filed under the treaty defined in section 351(a).

3. Claims 8, 15, 23-27 and 29-30 are rejected under 35 U.S.C. 102(e) as being clearly anticipated by Yang (6,159,822).

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Yang teaches the device of claims 8, 15, 23-27 and 29-30 in that, shallow trenches of different widths (figure 1), filled with non-conformal high-density plasma (HDP) silicon oxide 130 to a predetermined height (which the instant application teaches forms a seamless trench fill). The trench fill is planar with the substrate (self planarized, column 5 lines 64-65, and figure 11 and figure 7 of the instant application, which is described as planar with the substrate surface). Yang also teaches pad oxide 120, removal of the trench fill from atop the pad oxide, so that trench fills remain and are separated.

Yang (column 2 lines 11 and 29) discusses a problem with conventional CMP (chemical mechanical polishing) in that micro-scratches are formed on the trench fill surface, thus, the solution of Yang produces a substantially scratch free surface.

Regarding the limitation of claim 29, where the substrate is formed without CMP or RIE (reactive ion etching), these are process steps and are given little weight toward the final device. Still, Yang teaches etching the fill back (column 4 lines 59-60) and does not use CMP or RIE.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claim 28 is rejected under 35 U.S.C. 103(a) as being unpatentable over Yang (US 6,159,822) in view of Brewer (US 6,322,600).

Yang teaches all of the parts of the substrate as claimed as recited in paragraph 3 above except for doping the trench fill. Brewer teaches filling a trench with a dielectric that includes one of BPSG (boron doped oxide glass), PSG (phosphorous doped oxide glass) and HDP oxides. Thus it is known to have a doped insulation trench fill and to obtain the desired dielectric properties, one skilled in the art would know to dope HDP oxide to achieve a dielectric constant to match that of a BPSG or PSG.

One skilled in the requisite art at the time of the invention would modify Yang by adding dopant to the oxide trench fill as suggested by Brewer with reasonable expectation of producing a trench fill of a desired dielectric constant.

Conclusion

6. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Yew US 66,590,299 fills trench with CVD oxide and laser anneals to cure microscratches

Liao US 6,110,795 fills trench, masks to prevent microscratches

Nitta US 6,225,230 fills trench with CVD oxide and mirror polishes to cure microscratches

7. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to David S. Blum whose telephone number is (703)-306-9168 and e-mail address is David.blum@USPTO.gov .

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Albert Paladini, can be reached at (703)-308-2005. Our facsimile number is (703)- 305-0142 and our receptionist's number is (703)-308-0956.

DSB

January 9, 2002

C. Chaudhari
Chandra Chaudhari
Primary Examiner